



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/801,095

03/15/2004

Dieter Meller

LIP 039

9266

32047 7590 03/06/2007

GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
55 SOUTH COMMERICAL STREET
MANCHESTER, NH 03101

EXAMINER

LEE, GILBERT Y

ART UNIT

PAPER NUMBER

3673

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

03/06/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/801,095

Applicant(s)

MELLER ET AL.

Examiner

Gilbert Y. Lee

Art Unit

3673

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9-11 and 14-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-11 and 14-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The amendment filed 12/26/06 has been entered.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

3. Claim 1 is objected to because of the following informalities: on page 5, line 12 "it's" should be changed to --its--. Appropriate correction is required.
4. Claims 22-24 are objected to because of the following informalities: the preamble to the claims clearly claim the subcombination of a sealing arrangement. However, the body of the claims claim the combination of a transmission/piston engine/combustion engine or steam engine and a sealing arrangement. The examiner is making an inquiry as to whether the applicant wishes to claim the combination or just the subcombination. For the purposes of this examination, the examiner is interpreting the claims be claiming only the subcombination of a sealing arrangement. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 20, 22-26 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "a fluid medium" on page 5, line 5; however, a fluid medium is already claimed on page 4, line 5. For the purposes of this examination, the examiner is interpreting the claim to read as --the fluid medium-- on page 5, line 5.

Claim 20 recites the limitation "a groove" in line 2; however, a groove is already claimed in claim 1, line 13. For the purposes of this examination, the examiner is interpreting the claim to read as --the groove-- in claim 20, line 2.

Claim 22 recites the limitation "the shaft" and "the shaft guide" in line 2. There is insufficient antecedent basis for these limitations in the claim.

Claim 23 recites the limitation "a groove" in line 2; however, a groove is already claimed in claim 1, line 13. For the purposes of this examination, the examiner is interpreting the claim to read as --the groove-- in claim 23, line 2.

Claim 24 recites the limitation "the piston" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 25 recites the limitation "a fluid medium" in line 2; however, a fluid medium is already claimed in line 5. For the purposes of this examination, the examiner is

Art Unit: 3673

interpreting the claim to read as --the fluid medium-- in claim 25, line 2. Claim 25 further recites the limitation "a component" in line 2; however, a component is already claimed in lines 1-2. For the purposes of this examination, the examiner is interpreting the claim to read as --the component accommodating the sealing ring-- in claim 25, line 2.

Claim 26 recites the limitation "a fluid medium" in line 23; however, a fluid medium is already claimed in line 4. For the purposes of this examination, the examiner is interpreting the claim to read as --the fluid medium-- in claim 26, line 23. Claim 26 further recites the limitation "a component" on page 13, line 2; however, a component is already claimed in lines 1-2. For the purposes of this examination, the examiner is interpreting the claim to read as --the component accommodating the sealing ring-- in claim 26, page 13, line 2.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-7, 9, 11, and 14-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US Patent No. 2,360,731) in view of Gripe et al. (US Patent No. 3,926,444).

Regarding claim 1, the Smith reference discloses a sealing arrangement (Fig. 1) consisting essentially of a sealing ring (3 or 3a) for sealing two components (1 and 5)

Art Unit: 3673

moving relative to each other including a radially external sealing surface (e.g. surface of element 3 or 3a in contact with element 5) that can be brought into contact with at least one of said components to form a seal against a fluid medium (Col. 3, Lines 13-20), where, to one side of the sealing surface, the sealing ring displays a pressurizing surface (e.g. left side of element 3 in Fig. 5) to be pressurized by the fluid medium (Fig. 5) and, on the opposite side, a supporting surface (e.g. right side of element 3 in Fig. 5, in contact with element 1) for positioning against a groove flank (e.g. flank of element 2 in contact with right side of element 3 in Fig. 5) of the component accommodating the sealing ring (Fig. 5),

wherein one of the two components displays a groove (2 or 8) without an undercut to receive the sealing ring (Fig. 6), where the groove displays a supporting flank (e.g. flank of element 2 in contact with right side of element 3 in Fig. 5) opposite the supporting surface of the sealing ring (Fig. 5), and a pressure-side flank (e.g. flank of element 2 adjacent the left side of element 3 in Fig. 5) opposite the pressurizing surface of the sealing ring (Fig. 5), where the sealing surface of the sealing ring projects from the receiving component in the radial direction (Fig. 3 and Fig. 5, note that in Fig. 3 the sealing surface is arcuate and in Fig. 5 it is deformed to be planar),

wherein the pressure-side flank and the supporting flank of the groove are inclined relative to the surface of the sealing ring, each enclosing an angle of less than 90 degrees towards the surface (Fig. 2),

wherein a gap (e.g. gap between left flank of element 2 and left side of element 3 in Fig. 5) is provided, at least between the pressurizing surface of the sealing ring and

Art Unit: 3673

the pressure-side flank (Fig. 5), into which a fluid medium to be provided on the pressure side of the sealing ring can flow, pressing the sealing ring in sealing fashion against the supporting flank of the groove and against one of said two components (Fig. 5), and , by application of pressure by the fluid medium, the supporting surface of the sealing ring can be brought into flat contact with the supporting flank of the groove, at least on the side facing the sealing surface (Fig. 5)

wherein the entire sealing surface is in sealing contact with one of said two components to form a seal when the sealing ring is pressurized (Fig. 5).

However, the Smith et al. reference fails to explicitly disclose the sealing ring being divided at one point on its circumference, forming a weaker area.

The Bingham et al. reference, a seal sealing a reciprocating shaft, discloses the seal being solid (Fig. 4) or the seal being divided (Fig. 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a break in the seal ring of the Smith reference in view of the teachings of the Bingham et al. reference to provide a seal that expands radially outward without substantially reducing the thickness of the seal member (Col. 3, Lines 17-22).

Regarding claim 2, the Smith reference, as modified in claim 1, discloses the pressurizing surface and the supporting surface, each forming a lateral surface of a truncated cone (Fig. 3).

Regarding claim 3, the Smith reference, as modified in claim 1, discloses the areas of the lateral surface of a truncated cone of the pressurizing surface or the

Art Unit: 3673

supporting surface, or of the pressurizing surface and the supporting surface, each enclose an angle of 30 degrees to 60 degrees with the sealing surface towards said sealing surface (Fig. 2 and Fig. 3).

Regarding claim 4, the Smith reference, as modified in claim 1, discloses the area of the pressurizing surface or the supporting surface, or of the pressurizing surface and the supporting surface, with the form of a truncated cone follows on laterally, at least almost directly, from the sealing surface (Fig. 3 and Fig. 5).

Regarding claim 5, the Smith reference, as modified in claim 1, discloses a surface (e.g. bottom curved surface of element 3 in Fig. 3) being located between the pressurizing surface and the supporting surface, opposite to the sealing surface, which is a lateral surface of a truncated cone, or a surface of a cylinder, or a concavely arched surface forming a transitional area (Fig. 3).

Regarding claim 6, the Smith reference, as modified in claim 1, discloses the radial thickness of the sealing ring being less than/equal to the extension of the sealing surface in the axial direction of the sealing ring (Fig. 3).

Regarding claim 7, the Smith reference, as modified in claim 1, discloses the pressurizing surface or the supporting surface, or the pressurizing surface and the supporting surface being profiled (Fig. 5).

Regarding claim 9, the Smith reference, as modified in claim 1, discloses the weaker area being designed as a complete division of the sealing ring (Bingham et al., Fig. 5, 64), forming two opposite sealing ring ends (Bingham et al., Fig. 5), in that at least one, integrally molded area extending in the circumferential direction of the sealing

Art Unit: 3673

ring is provided on each of the sealing ring ends (Bingham et al., Fig. 5) and in that the areas associated with different sealing ring ends are located one behind the other in the axial direction of the sealing ring, forming a labyrinth seal, and are in contact with each other, at least in operating condition of the sealing ring (Bingham et al., Fig. 5).

Regarding claim 11, the Smith reference, as modified in claim 1, discloses the sealing surface being designed as the surface of a cylinder (Smith, Col. 2, Line 26).

Regarding claim 14, the Smith reference, as modified in claim 1, discloses the gap extending at least partially over the side of the sealing ring opposite the sealing surface of the sealing ring which forms a transitional area between the supporting surface and the pressurizing surface (Smith, Fig. 5).

Regarding claim 15, the Smith reference, as modified in claim 1, discloses the sealing ring projecting from the groove in the component in the radial direction by less than one-third of its radial thickness (Smith, Fig. 5).

Regarding claim 16, the Smith reference, as modified in claim 1, discloses the supporting flank of the groove **capable of** being brought into full contact with the supporting surface of the sealing ring by pressurizing the fluid medium (Smith, Fig. 5).

Regarding claim 17, the Smith reference, as modified in claim 1, discloses the gap displaying an **essentially** constant gap width over its radial extension (Smith, Fig. 5).

Regarding claim 18, the Smith reference, as modified in claim 1, discloses the groove being of rounded design in the area of the groove base (Smith, Fig. 5).

Regarding claim 19, the Smith reference as, modified in claim 1, discloses a first component (Smith, 1), which displays the sealing ring accommodated in a circumferential groove (Smith, Fig. 5), and in that a second component (Smith, 5) is provided, which is capable of motion relative to the first component and with which the sealing surface of the sealing ring can be brought into contact in sealing fashion during motion of the components relative to each other, and in that the sealing ring is located in the groove without pretension in relation to the component to be sealed (Smith, Fig. 4).

Regarding claim 20, the Smith reference, as modified in claim 1, discloses the component accommodating the sealing ring in the groove is a shaft (Smith, Col. 2, Lines 19-26), with which the sealing surface of the sealing ring can be brought into contact in sealing fashion by application of the pressure of the fluid medium during rotary motion of the shaft and the shaft guide relative to each other (Smith, Fig. 5), and in that the supporting surface of the sealing ring is inclined to the longitudinal axis of the sealing ring such that, owing to the pressure force of the fluid medium on the sealing ring, the sealing ring is located in non-rotating fashion relative to the shaft guide (Smith, Fig. 5). Note that it is well-known for shaft guides to be made of light metal.

Regarding claim 21, the Smith reference, as modified in claim 1, discloses the component accommodating the sealing ring (Smith, 3a) being a shaft guide (Smith, 5), and in that a shaft (Smith, 1) capable of rotation relative to it is provided (Smith, Fig. 6), with which the sealing surface of the sealing ring can be brought in to contact in sealing fashion (Smith, Fig. 6).

Regarding claims 22-24, the Smith reference, as modified in claim 1 and as best understood, discloses the shaft (Smith, 1) and the shaft guide (Smith, 5).

Regarding claim 25, the modified Smith reference, discloses the invention substantially as claimed in claim 1, including a transitional area (e.g. Smith, bottom curved portion of element 3 in Fig. 3) connecting the pressurizing surface and the supporting surface opposite to the sealing surface (Smith, Fig. 3), wherein the pressurizing surface and the supporting surface are inclined relative to the sealing surface and enclose an angle of about 30 degrees to 60 degrees towards it (Smith, Fig. 3),

wherein the pressure-side flank and the supporting flank of the groove are inclined relative to the sealing surface of the sealing ring, each enclosing an angle of about 30 degrees to 60 degrees towards it (Smith, Fig. 2), and

wherein the transitional area of the sealing ring being arranged at the base of the groove (Smith, Fig. 5).

Regarding claim 26, the modified Smith reference, discloses the invention substantially as claimed in claim 1, including a transitional area (e.g. Smith, bottom curved portion of element 3 in Fig. 3) connecting the pressurizing surface and the supporting surface opposite to the sealing surface (Smith, Fig. 3),

wherein the pressurizing surface and the supporting surface are inclined relative to the sealing surface and enclose an angle of less than 90 degrees towards it (Smith, Fig. 3),

wherein the groove is of concave rounded design in the central area of the groove base and in both transitional areas to both adjacent groove flanks, with a continuous transition of the concave groove base to the groove flanks (Smith, Fig. 5), and

wherein the transitional area of the sealing ring being arranged at the base of the groove (Smith, Fig. 5).

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Bingham et al. as applied to claims 1-7, 9, 11, and 14-26 above, and further in view of Flick (US Patent No. 2,970,871).

Regarding claim 10, the modified Smith reference, discloses the invention substantially as claimed in claim 1, including the seal ring being made of rubber (Smith, Col. 3, Lines 48-52).

However, the modified Smith reference fails to explicitly disclose the material of the seal ring consisting of a plastic with an elongation at break at room temperature of \leq 50 percent.

The Flick reference, a piston ring, discloses that seals maybe made of rubber, synthetic rubber, or PTFE (Col. 3, Lines 42-48).

It would have been obvious at the time the invention was made to provide the seal ring of the modified Smith reference with PTFE in view of the teachings of the Flick reference to provide a material having a desired hardness.

Response to Arguments

8. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

9. With regards to the applicant's argument of claim 1, specifically the "sealing arrangement consisting essentially of", the argument is not persuasive because the MPEP clearly states that "consisting essentially of" will be considered equivalent to "comprising".

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

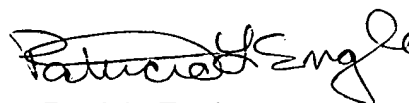
Art Unit: 3673

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gilbert Y. Lee whose telephone number is 571-272-5894. The examiner can normally be reached on 8:00 - 4:30, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patricia L. Engle can be reached on (571)272-6660. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GL
February 26, 2007

A handwritten signature in black ink, appearing to read "Patricia Engle", written in a cursive style.

Patricia Engle
Supervisory Examiner
Tech. Center 3600